

Photolytic Reduction of Phenyl Quinolin-3-yl Ketone to 3-Benzylquinoline

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Summary Photolytic reduction of phenyl quinolin-3-yl ketone yields 3-benzylquinoline in addition to the expected carbinol and pinacol.

THE electrolytic reduction of ketones may yield the fully reduced hydrocarbon in addition to the carbinol and pinacol products.^{1,2} The photolytic reduction of ketones also results in carbinol and pinacol formation³ but the reduction of the carbonyl function to the hydrocarbon has not been reported. We now report the photolytic reduction of the carbonyl function of phenyl quinolin-3-yl ketone to 3-benzylquinoline.

A solution of phenyl quinolin-3-yl ketone in degassed propan-2-ol was irradiated with a 450 W Hanovia high-pressure source. The solid pinacol was removed and the mother liquor was shown by g.l.c. to contain, in order of increasing retention time, 3-benzylquinoline, phenyl quinolin-3-yl ketone, and phenyl(quinolin-3-yl)methanol respectively. The amount of 3-benzylquinoline varied

from <1% when a Corex filter was used (6 h irradiation) to ca. 12% when a quartz filter was used (3–6 h).

Products were identified by comparison of their retention time and mass spectra with those of authentic samples and products isolated from the electrolytic reduction of phenyl quinolin-3-yl ketone.^{4,5}

Both 3-benzylquinoline and phenyl(quinolin-3-yl)methanol were formed in varying amounts in all four reactions. The possibility that phenyl(quinolin-3-yl)methanol was an intermediate was supported by its irradiation in degassed propan-2-ol under the original conditions. A complex mixture of photoproducts was formed of which the largest component was shown to be 3-benzylquinoline (ca. 44%). The other major product (ca. 29%) was shown by mass spectrometry to be a benzyltetrahydroquinoline.

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¹ M. M. Baizer and J. J. Petrovich, *Progr. Phys. Org. Chem.*, 1970, **7**, 203.

² S. Swann, jun., 'Electrolytic Reactions', 'Technique of Organic Chemistry', 2nd edn., vol. 2, ed. A. Weissberger, Interscience, New York, 1956, pp. 385–523, and references contained therein.

³ D. C. Neckers, 'Modern Organic Photochemistry', Reinhold, New York, 1967, pp. 163–172.

⁴ R. Isbrandt, E. V. Brown, and H. H. Bauer, 'Electrolytic Preparation of 1,2-Diquinolyl-1,2-Diphenylethane-1,2-Diols,' Third Central Regional Meeting of the American Chemical Society, June 6, 1971, Cincinnati, Ohio, Abstract No. 37.

⁵ R. Isbrandt, R. Schmid, A. C. Plasz, E. V. Brown, and H. H. Bauer, unpublished data.